

**ABSTRACT****RAPID START FUEL REFORMING SYSTEMS AND TECHNIQUES**

An on-board fuel processor includes a microchannel steam reforming reactor (30) and a water vaporizer (40) heated in series with a combustion gas. The reformer (30) and the vaporizer (40) are both of a cross-flow panel configuration that allows for low combustion side pressure drop. Fuel is directly injected into the steam, and during a rapid cold start, both the combustion gas flow rate and the steam to carbon ratio are substantially increased relative to their steady state operating values. A rapid cold start can be achieved in under 30 seconds with a manageable amount of electric power consumption, removing impediments to use in automotive fuel cell applications.